



TITLE:

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AUTHOR(S):

Kirihata, Tetsuya

CITATION:

Kirihata, Tetsuya. The Cultivation of New Technology-Based Firms and Roles of Venture Capital Firms in Japan. 京都大学大学院経済学研究科Working Paper 2007, 90

ISSUE DATE:

2007-08

URL:

<http://hdl.handle.net/2433/65729>

RIGHT:

Working Paper No.90

The Cultivation of New Technology-Based Firms and
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Tetsuya Kiriata¹

August, 2007

¹ Associate Professor, Ph.D., Kansai Urban Banking Corporation Chair of Kansai Economic and Management Research, Graduate School of Management, Kyoto University, Yoshida-Hommachi, Sakyo-Ku, Kyoto, 606-8501, JAPAN, E-mail: kiri()gsm.kyoto-u.ac.jp(@)
Visiting Associate Professor, Intellectual Property Division, Nara Institute of Science and Technology

Abstract

In this paper, I analyze post-investment activities of venture capital firms (VCFs) based on a questionnaire survey and discuss the issues and challenges of post-investment activities of VCFs with new technology based firms (NTBFs) in Japan.

The questionnaire survey reveals that business supports desired by NTBFs can be classified into four groups—"business strategies adjustment and motivation", "business advice and networking", "finance and crisis management", and "recruitment assistance". The questionnaire found that the business support most needed by NTBFs is "business strategies adjustment and motivation", followed by assistance in "business advice and networking", "recruitment assistance", and, lastly, "finance and crisis management". On the other hand, the actual support most provided by VCFs is "business advice and networking", followed by supports in terms of "finance and crisis management", "business strategies adjustment and motivation", and "recruitment assistance".

In Japan, there is a low percentage of VCFs engaging in post-investment activities involving recruitment assistance. Providing supports in recruitment activities may be an effective way for VCFs to differentiate their support services for NTBFs. To contribute to the growth of NTBFs in Japan, it seems important to provide a support environment for recruitment assistance.

Keywords New Technology Based Firms, Needs for Business Support, Venture Capital Firms, Post-Investment Activities, Recruitment Assistance

1. Introduction

New technology based firms (hereafter abbreviated NTBFs) are defined in this paper as innovative and progressive small firms that base themselves on inventions generated by technological ideas and pursuing leading-edge technology businesses focusing on their own intellectual properties². NTBFs are denoted by Pfirrmann, Wupperfeld and Lerner (1997:1) as important vehicles for technological invention commercialization.

The commercialization of technological invention is perceived to be one of the ways to help boosting economic development. It is evidenced that the fostering of entrepreneurial companies and venture capital firms (here after abbreviated VCFs) has played an important role in the development of today's large businesses such as Google, Apple and Intel (Florida and Kenney, 1988; Pfirrmann, Wupperfeld and Lerner, 1997).

² Christensen (1997) stated that technology is the process through which an organization transforms labor, raw material, and data into value-added products and services. Changes in technology are called innovation and innovation in the process of transforming into value-added products does not only occur in engineering and manufacturing.

Even though the amount of venture capital investment is rather small in comparative to GDP, it is still a major source of funding for new technology-based companies (OECD 2003: 46). This risk money alone, however, is not the only requirement for venture capital invested in technologically innovative companies to become successful (Timmons and Bygrave, 1986: 161). Sahlman (1990: 473) indicated that Venture Capitalists (hereafter abbreviated VCists) also actively participate in the management of the ventures they invested in and typically becoming members of the board of directors and retaining important economic rights in addition to their ownership right.

This paper carefully studies post-investment activities of VCFs in Japan. The paper's purpose is to contribute to the analysis of issues and challenged of VCFs' post-investment activities involving NTBFs.

2 Methodology

For information regarding NTBFs, a questionnaire-based survey was conducted with managers and employees of NTBFs who attended a distance learning program offered by Nara Institute of Science and Technology. Among all attendees, 184 business entities seeking to establish businesses based on intellectual properties, including patents were surveyed through questionnaires delivered via electronic or postal mail.

In total, 116 business entities responded to the questionnaire distributed between mid-November and December 2004 (response rate of 63 percent). Out of these 116 responding entities, 47 unlisted companies currently applying for or have already obtained patents were identified and selected for study in this paper. Among all reported patents, the information technology related patents account for 19 percent, followed by patents related to biotechnology and health care (15 percent), and nanotechnology (2 percent). Patents involving other types of technological areas and questionnaires with no-response in this regard accounts for 64 percent.

For additional data concerning VCFs' post-investment activities, another set of questionnaire forms were sent to a total of 103 VCFs listed on the "Japan Venture Capital Directory" published by Venture Enterprise Center in 2003. This paper analyzes 32 VCFs responses in which returned before mid-November, 2004, having response rate of 29 percent.

3. Business supports desired by NTBFs

The survey first asked NTBFs regarding their needs for business supports. The list of business assistance was selected based on prior researches by Harrison and Mason (1992), and Higashide and Birley (1999). This includes assistance concerning debt/equity arrangements, financial advice, mentoring/coaching, recruitment, management advice, business strategies adjustments, professional connections (with accountant, for example), industrial competition advice, marketing plans, advice on short-term crisis, and advice on private matters. The level of need for assistance is divided into four levels from "not at all necessary (level 1)" to "very necessary (level 4)". The assistance on industrial competition advice is determined to be the highest required assistance on average, followed by assistance concerning marketing plans, and

business strategies adjustments and advice on short-term crisis (see table 1).

Table 1: NTBFs' needs for business support

	Mean	S.D.
Debt/equity arrangements	2.38	0.87
Financial advice	2.46	0.88
Mentoring/coaching	2.89	0.93
Recruitment	2.63	0.78
Management advice	2.84	0.67
Business strategies adjustments	2.95	0.76
Professional connections	2.89	0.79
Industrial competition advice	3.31	0.73
Marketing plans	3.10	0.74
Advice on short-term crisis	2.95	0.80
Advice on private matters	2.45	0.84

Note: $N = 47$

Since the items used in this survey do not cover all details of business support possibly desired by NTBFs, the grouping of these supports into broader categories shall provide a better indicator for business assistance desired by NTBFs. Table 2 shows the result of this categorization using the principal component analysis.

The first group of business support comprised of assistance concerning advice as mentoring/coaching, management advice and business strategies adjustments. The group is labeled as assistance regarding “business strategies adjustment and motivation (factor 1)”. The second group covers advice on private matters, industrial competition advice and professional connection, which can be interpreted as “business advice and networking (factor 2)”. The third group is named “finance and crisis management (factor 3)”. This includes advice on short-term crisis, debt/equity arrangements and financial advice. Lastly, the forth group, “recruitment assistance (factor 4)”, is labeled according to its content which pinpoints only assistance regarding recruitment.

The averages of each mean values for components in each business support categories were recalculated to further explore which types of business support in broad assistance terms are the most required by NTBFs. The results reveal that the need for support in factor 1, Business strategies adjustment and motivation, is the highest at 2.89 average score. Factor 2, business advice and networking, and factor 4, recruitment, follow at 2.88 and 2.63, respectively, leaving factor 3, finance and crisis management, marking the lowest average score at 2.59.

Table 2: The classification of business support desired by NTBFs

	Factor 1	Factor 2	Factor 3	Factor 4
Debt/equity arrangements	0.468	0.128	<u>0.700</u>	-0.127
Financial advice	0.531	-0.005	<u>0.695</u>	-0.255
Mentoring/coaching	<u>0.831</u>	-0.086	0.167	0.046
Recruitment	0.200	0.254	0.216	<u>0.809</u>
Management advice	<u>0.796</u>	0.401	-0.047	0.041
Business strategies adjustments	<u>0.769</u>	0.209	0.201	0.183
Professional connections	0.392	<u>0.682</u>	0.173	-0.126
Industrial competition advice	-0.450	<u>0.700</u>	-0.032	-0.006
Marketing plans	0.026	0.415	0.220	-0.711
Advice on short-term crisis	-0.119	0.088	<u>0.787</u>	0.224
Advice on private matters	0.320	<u>0.768</u>	0.087	0.087
Eigenvalue	2.929	2.018	1.796	1.351
Com. %	26.627	44.97	61.299	73.582

Note: - The four factors were extracted with an eigenvalue greater than 1.0.

- An eigenvalue greater than 0.6 was used as the criterion for interpretation.

- The varimax method was adopted.

4. Post-investment activities of VCFs in Japan

4.1. VCFs' post-investment activities

This section moves on to information regarding VCFs and their post-investment activities. Table 3 shows the percentage of VCFs who have experienced in engaging in post-investment activities. Among all VCFs, involvement in professional connections, financial advice and management advice is the highest at 84.4 percent on average. This is followed by activities concerning debt/equity arrangements and industrial competition advice at 75 percent.

When analyzing VCFs' post-investment activities based on the broad four groups of business assistance, the average of involvement percentage is 72.9 for factor 1, 74.0 for factor 2, 71.9 for factor 3, and 62.5 for factor 4. This shows that VCFs are involved in business advice and networking activities the most, while engaging in recruitment assistance the least.

The results of this study when compared to those from prior researches (Higashide and Birley, 1999; Harrison and Mason, 1992) reveal interesting findings. When comparing this study to the study of Higashide and Birley's research (1999) based on the comparable eleven business assistance components, the average percentages of VCFs engaged in post-investment activities are nearly the same; 71.4 percent in Higashide and Birley (1999), and 71.0 percent in this survey. However, when comparing the three studies' results based on comparable seven business assistance components, the findings are rather diverse. The average percentage of VCFs engaging in post-investment activities is lowest in Harrison and Mason's study (1992) at 51.1 percent. The result from this study is far higher at 66.5 percent, although Higashide and

Birley's study (1999) shows the highest involvement at 68.8 percent. In general, the percentage of VCFs engaging in post-investment activities in Japan presently is nearly the same as that in the UK in the late 1990's.

Table 3: Post-investment activities of VCFs in Japan and the UK

	Japan	The UK	
	2004	Higashide and Birley (1999)	Harrison and Mason (1992)
Debt/equity arrangements	75.0	72.5	49.4
Financial advice	84.4	82.5	N/A
Mentoring/coaching	62.5	92.5	41.3
Recruitment	62.5	53.8	39.7
Management advice	84.4	88.8	N/A
Business strategies adjustments	71.9	71.3	61.5
Professional connections	84.4	72.5	N/A
Industrial competition advice	75.0	41.3	44.2
Marketing plans	62.5	80.0	51.3
Advice on short-term crisis	56.3	70.0	70.5
Advice on private matters	62.5	60.0	N/A

Note: - Data for Japan, 2004; N = 32

- The numerical values are the percentage of VCFs engaged in post-investment activities.

4.2 VCFs' recognition of helpful post-investment activities to NTBFs

The questionnaire further questioned VCFs regarding their recognition of NTBFs' needs for their post-investment activities. VCFs were to choose among "not at all necessary (level 1)", "not necessary (level 2)", "necessary (level 3)", and "very necessary (level 4)". Activities involving financial advice is the highest (3.77), followed by debt/equity arrangements (3.71). The lowest is activities concerning industrial competition advice at 3.00, and advice on private matters at 3.03 (See Table 4).

When exploring in terms of the four broad assistance categories, the averages of mean values are 3.37 for factor 1, 3.16 for factor 2, 3.60 for factor 3, and 3.16 for factor 4. In other words, activities concerning finance and crisis management are identified as the most necessary for NTBFs, while activities involving business advice and networking, as well as, recruitment assistance, are the least recognized as important activities.

Table 4: VCFs' recognition of helpful post-investment activities to NTBFs

	Mean	S.D.
Debt/equity arrangements	3.71	0.52
Financial advice	3.77	0.42
Mentoring/coaching	3.19	0.60
Recruitment	3.16	0.63
Management advice	3.57	0.50
Business strategies adjustments	3.35	0.70
Professional connections	3.45	0.72
Industrial competition advice	3.00	0.57
Marketing plans	3.26	0.63
Advice on short-term crisis	3.32	0.65
Advice on private matters	3.03	0.75

Note: $N = 32$

4.3 VCFs' involvement as board members to NTBFs

In this survey, I also questioned VCFs regarding their actual participation or interests in participating with their portfolio companies as an external board member. As to their interest in participation, 53.1 percent responded with great interest, 34.4 percent replied with some interest, 6.3 percent revealed little interest, and 6.3 percent showed no interest. In total, 87.5 percent of VCFs expressed an interest in participating as an external board member to their portfolio companies' management teams. Regarding the question of whether VCFs had actually participated as external board members with their portfolio companies, 37.5 percent replied they had, while 62.5 percent had not. It is interesting to note that the majority of VCFs reveal high attention in participating as board members, but only 37.5 percent had actually taken action in such manner.

5. Summary and implications

5.1. Summary

This questionnaire survey reveals the following findings regarding NTBFs' needs for business support and VCFs' post-investment activities in Japan:

NTBFs' needs for business support

Through classification and interpretation using principle components analysis, NTBFs' desire for business support can be divided into four categories—business strategies adjustment and motivation, business advice and networking, finance and crisis management, and recruitment assistance. The need for assistance relating to business strategies adjustment and motivation is the highest, while the need for support in terms of finance and crisis management is the lowest.

VCFs' post-investment activities

When looking at each of the support needs identified in this survey, the highest rate of assistance necessary for NTBFs are those in the category of finance and crisis management, while business advice and networking, and recruitment assistance are perceived to be business activities that request the least support. The actual post-investment activities of VCFs coincide with their perception of support necessity. The highest involvement is activities in the category of business advice and networking and the lowest rate of involvement is with recruitment assistance.

In this survey, the percentage of VCFs participating in post-investment activities with their portfolio companies is almost the same as the finding in the UK in 1997. However, only 38 percent of those VCFs had actually participated with their portfolio companies as external board members. High costs of participation could be the cause of such low percentage of VCFs' engagement in post-investment activities.

5.2. Implications

I will now discuss issues and challenges in enhancing VCFs' capability in adding value to their investments with NTBFs in Japan.

As a result of this research, business supports regarding business strategies adjustment and motivation, and business advice and networking are both important in NTBFs' perception. Their needs for such supports are high. At the same time, from VCFs' viewpoints, the supports in these areas are also recognized as highly important for NTBFs. VCFs' actual involvement in post-investment activities and NTBFs' needs for assistance in these areas coincide.

On the other hand, the results are contradictory in the areas of finance and crisis management and recruitment assistance. The survey results from NTBFs show that the support needed for finance and crisis management is the least necessary, while the assistance for recruitment is higher. However, it seems that VCFs have a strong belief that involvement in term of finance and crisis management support is the most effective post-investment activity, considering from their high involvement in financial support. At the same time, VCFs show lowest engagement in recruitment assistance. These findings contradict with NTBFs' need in which seems to be higher for assistance in recruitment than in financial related activities.

According to Hellmann and Puri (2002), VCFs in Silicon Valley are actively involved in personnel policies—recruitment assistance of marketing specialists and replacement of CEOs. VCFs in which had experience in replacing CEOs of their portfolio companies revealed that they had replaced at least 3 CEOs on average (Gorman and Sahlman, 1989:231). It can be implied that involvement in recruitment assistance including the hiring of management personnel and CEOs is a major post-investment activity among VCFs in the U.S. (Hellmann and Puri, 2002:194) and that VCFs can actually contribute to the growth of start-up companies through post-investment activities that focus on personnel matters.

In contrary to the case of VCFs in the US, there is a relatively low percentage of VCFs engaging in post-investment activities involving recruitment assistance in Japan. Providing

support in recruitment activities may be an effective way for VCFs to differentiate their support services to NTBFs. To contribute to the growth of NTBFs in Japan, it seems important to provide a support environment for recruitment assistance.

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